



iMETOS LoRa Communication Terminal

Guide

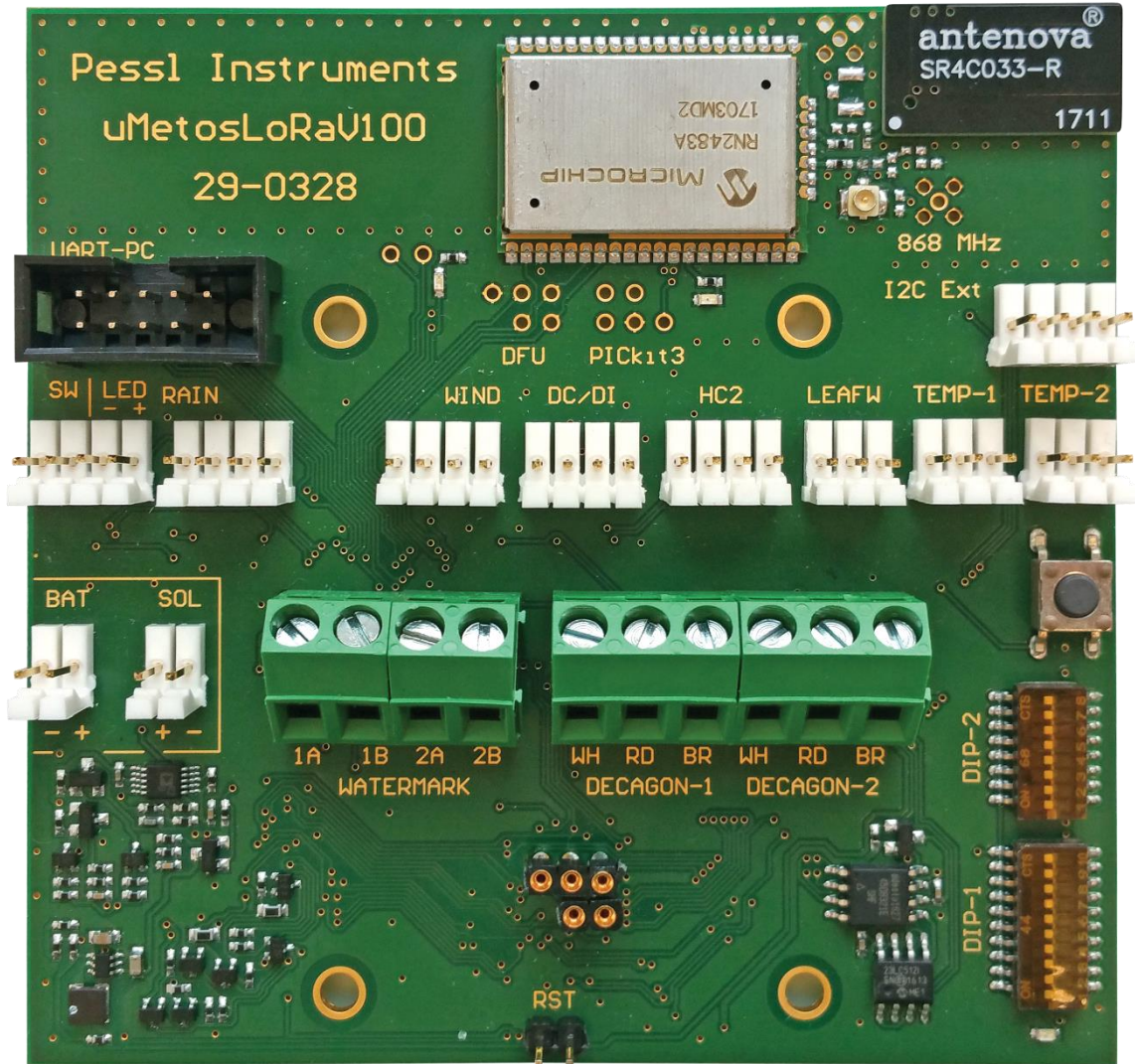
Pessl Instruments, GmbH

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1. Top view of the iMETOS LoRa board



Picture 1 - Top view of the iMETOS LoRa board (29-0328)



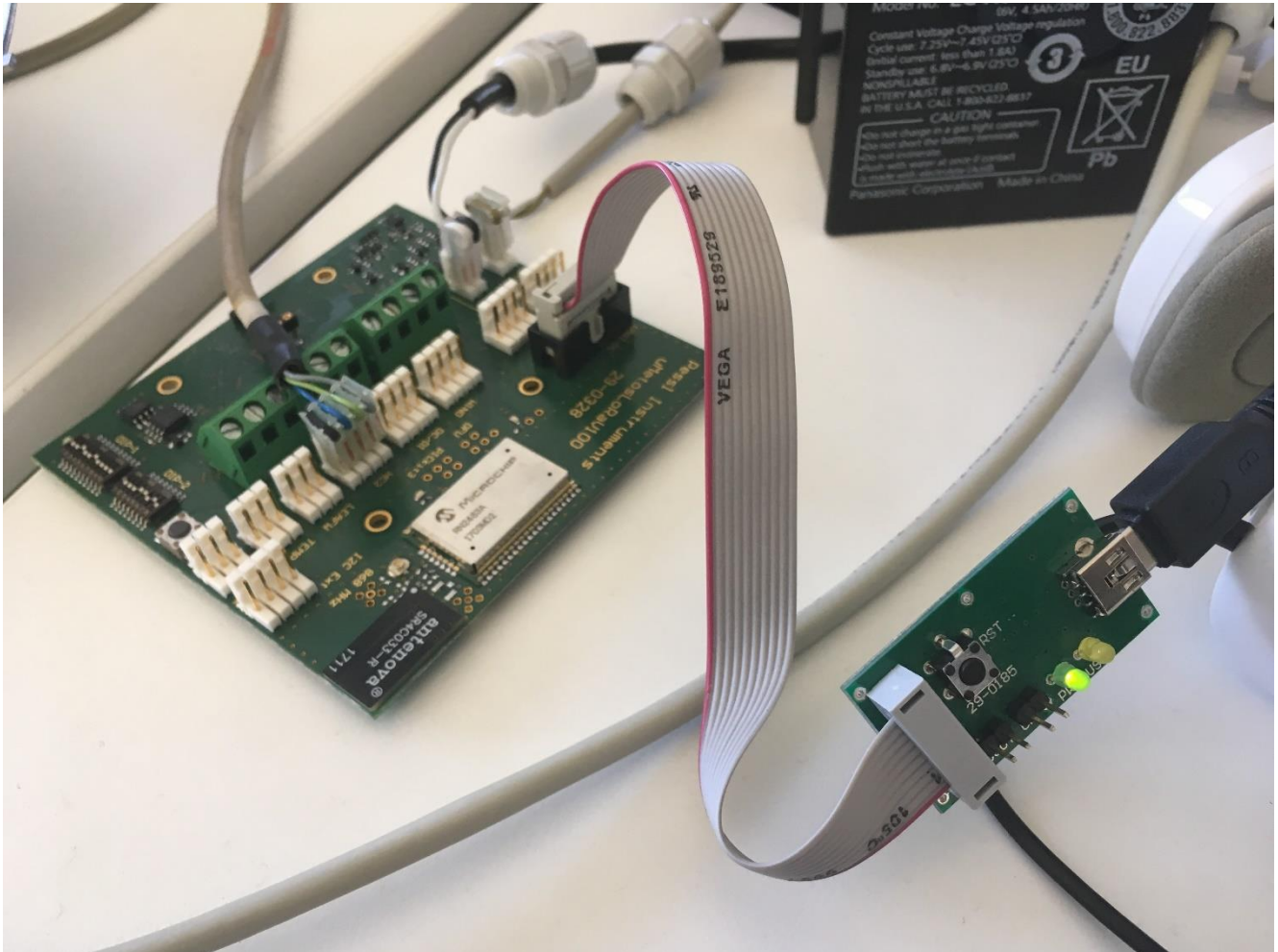
- | | | |
|--|---|-------------------------------------|
| 1. PC terminal connector | 7. Leaf wetness sensor or pressure switch | 13. Connector for 2 Decagon sensors |
| 2. External communication button with blue LED | 8. Extra temperature sensor | 14. I2C External connector |
| 3. Rain gauge or flow meter | 9. Extra temperature sensor | 15. DIP-1 |
| 4. Wind Speed sensor | 10. Lithium primary battery | 16. DIP-2 |
| 5. Duty Cycle sensor or Digital input | 11. Solar panel | 17. Connect button |
| 6. HC2 temperature & relative humidity | 12. Connector for 2 Watermark sensors | 18. LoRa module |
| | | 19. On-board LoRa antenna |

Picture 2 - Connectors on the iMETOS LoRa board (29-0328)

2. Connecting the iMETOS LoRa board to the PC

In order to access the terminal menu, user needs to connect the serial cable to the UART – PC (picture 2, connector 1) 10 pin connector on the iMETOS LoRa board and the other end to the USB port of the PC.

The iMETOS LoRa board needs to be connected to the power source (battery).



Picture 3 - Connected serial cable to the iMETOS LoRa board

3. Accessing the terminal menu

Serial port settings

- Baud rate 38400 bps
- Data byte 8 bits
- Start bit 1 bit
- Stop bit at least 1 bit
- Parity None

4. Main menu

To access the main menu, press the 'H' key.

MAIN MENU:

- 1 - Print system info
- 2 - Print last raw data of data memory
- 3 - Print all raw data of data memory
- 4 - Print sensors configuration set
- 5 - Sensor testing
- 6 - Print all control registers of data memory
- 7 - Print DataFlash memory organization
- 8 - Make a new sensors configuration set
- A - Setup the measure/logging intervals
- B - Setup the system date and time

- L - Print LoRaWAN info
- P - Setup LoRaWAN parameters
- M - LoRaWAN bridge mode

4.1 Print system info

Key: 1

Description: print system info gives back basic information of the iMETOS LoRa station

Example:

```
iMETOS LoRaWAN - System info:

Hardware version:      v1.00
Firmware version:     v1.03
Firmware revision date: 2017-10-11 12:46:00
Serial Number:        03200003
Current date and time: 2000-01-01 00:46:03

Status of measurement: running
Next alarm time:      00:47:00
Measure interval [sec.]: 60
Logging interval [sec.]: 180 (Transmission int.)
```

4.2 Print last raw data of data memory

Key: 2

Description: prepared for future use - does not return anything for now

Example:

Last raw data records from DataFlash memory:

```
Ord.Nm.  RECORD HEADER          RAW SENSOR DATA VALUES
-----  ----->
```

4.3 Print all raw data of data memory

Key: 3

Description: prints out all stored reading from sensors in the data flash memory

Example:

All raw data records from DataFlash memory:

```
Ord.Nm.  RECORD HEADER          RAW SENSOR DATA VALUES
-----  ----->
0000001  21 39 01 2000-01-01 00:03:00  1A08 0608 00000000 1F39 1EE1 1F8B 076B 075B 077D 00 00 00
0000002  21 E2 01 2000-01-01 00:06:00  1A04 0382 00000000 1E6A 1E3E 1EAB 079A 078D 07AA 00 00 01
0000003  21 2D 01 2000-01-01 00:09:00  19FF 030F 00000000 1DD7 1D9F 1E14 07C3 07BB 07D0 00 00 02
0000004  21 49 01 2000-01-01 00:12:00  19F8 0276 00000000 1D4B 1D17 1D77 07E1 07D7 07EB 00 00 03
0000005  21 E2 01 2000-01-01 00:15:00  19F4 0247 00000000 1CD9 1CB7 1CFB 07F8 07F2 07FE 00 00 04
0000006  21 07 01 2000-01-01 00:18:00  19F0 0266 00000000 1C77 1C5D 1C95 080A 0806 0810 00 00 04
0000007  21 26 01 2000-01-01 00:21:00  19EB 01A9 00000000 1C2B 1C19 1C4C 0818 0814 081F 00 00 05
0000008  21 CA 01 2000-01-01 00:24:00  19E9 021F 00000000 1C0F 1C08 1C19 0826 0824 082C 00 00 06
0000009  21 AB 01 2000-01-01 00:27:00  19E4 025E 00000000 1BED 1BDB 1C03 0831 082E 0835 00 00 07
0000010  21 7B 01 2000-01-01 00:30:00  19E0 027E 00000000 1BD1 1BCA 1BDB 083A 083A 083B 00 00 07
0000011  21 84 01 2000-01-01 00:33:00  19C1 02DC 00000000 1BAE 1BA0 1BBC 0843 083F 0845 00 00 08
0000012  21 20 01 2000-01-01 00:36:00  19B8 0347 00000000 1B92 1B84 1B9D 084B 084B 084D 00 00 07
0000013  21 9F 01 2000-01-01 00:39:00  19B1 030F 00000000 1B81 1B7B 1B87 0851 084E 0854 00 00 06
0000014  21 4B 01 2000-01-01 00:42:00  19AB 04A1 00000000 1B6A 1B64 1B72 0857 0857 0858 00 00 08
0000015  21 57 01 2000-01-01 00:45:00  19A6 05E4 00000000 1B46 1B32 1B51 085A 0857 085E 00 00 08
0000016  21 E4 01 2000-01-01 00:48:00  199F 074B 00000000 1B34 1B32 1B38 0861 0860 0862 00 00 09
```

4.4 Print sensors configuration set

Key: 4

Description: displays last detected sensor configuration set connected to the device

Example:

Sensors configuration set:

Chan.	S.Code	Full Name	Short	Unit	Size	LST	SUM	AVG	MIN	MAX	TIM	USE	AXL
1	0x0007	Battery voltage	BATTR	mV	2	X							
2	0x001E	Solar Panel	SOLPN	mV	2	X							
4	0x002B	Water meter 1L	WMTRC L	4		X							
12	0x01FB	HC Relative humidity	HC-RH	%	2			X	X	X			
13	0x01FA	HC Air temperature	HC-TM	C	2			X	X	X			
14	0x0004	Leaf Wetness	LEAFW	Min	1							X	
17	0x007B	Watermark	WMARK	cBar	1			X					
18	0x007B	Watermark	WMARK	cBar	1			X					

4.5 Sensor testing

Key: 5

Description: executes the measurements and displays the current value of the sensors

Example:

Sensor testing:

Input	Full Name Of Sensor	Short	Value	Unit	Notes
	Battery voltage	BATTR	6539	mV	
	Solar Panel	SOLPN	1926	mV	
	Water meter 1L	WMTRC	0	L	Pulse resolution = 1 L (Non-Resettable counter)
	HC Relative humidity	HC-RH	68.92	%	
	HC Air temperature	HC-TM	21.52	C	

```
Leaf Wetness      LEAFW      dry
1 Watermark       WMARK     0      cBar
2 Watermark       WMARK    10      cBar
```

Done.

4.6 Print all control registers of data memory

Key: 6

Description: displays the info regarding the memory usage and records

Example:

Control registers of data memory:

```
The number of all records = 17
The number of prev. rec. = 1
The number of last records = 0
Pointer to initial record = 0
Pointer to prev. start rec.= 16
Pointer to starting record = 17
Pointer to next record    = 17
Pointer of Memory Ctrl.   = 17
Force data saving         = FALSE

Size of SD record        = 33
Max. number of rec. ptrs = 127896
Max. number of SD rec.   = 127894
Number of SD values      = 12
Number of 1k thresholds  = 0
```

4.7 Print DataFlash memory organization

Key: 7

Description:

Example:

DataFlash memory organization:

```
DataFlash memory size = 4325376
Record Ctrl Reg. adr. = 1584
Sensor Config. Set adr. = 1597
Sensor Config. Set size = 102
SD Record memory adr. = 4752
SD Record memory size = 4220624
Events Rec. memory adr. = 4225376
Events Rec. memory size = 100000
SD Record (max. size) = 138
```

4.8 Make a new sensor configuration set

Key: 8

Description: rechecking of the currently connected sensors and saving of the sensor set connected to the device

Example:

Do you really want to make a new sensors configuration set? [Y - Yes / N - No]

```
New sensors configuration set:
AWS sensor config... restored!
Static data rewritten!
Done.
```

4.9 Setup the measure/logging intervals

Key: A

Description: setting up the measurement interval and logging interval. Logging interval is also the communication interval. By default it is set to 5 minute measurement, 15 minute logging interval.

Example:

Set up the measure/logging interval:

```
Enter NEW MEASURE INTERVAL (600 sec.) [in seconds] (from 5 to 86400) = 300
Enter NEW LOGGING/TRANSMISSION INTERVAL (1800 sec.) [in seconds] (from 5 to 86400) = 900
The new intervals changed!
```

```
Current status of intervals:
Measure interval [sec.]: 300
Logging interval [sec.]: 900 (Transmission int.)
```

4.10 Setup the system date and time

Key: B

Description: setting up the correct date and time on the station. **Beware!!** If the station is reset (battery disconnect) it will lose the set date and time and it will go back to default value of 2000-01-01 00:00:00.

Example:

Set up the system date and time:

```
Enter NEW DATE AND TIME [in format: YYYY-MM-DDThh:mm:ss] = 2017-10-27T12:00:00
RTC upgraded.
```

4.11 Print LoRaWAN info

Key: L

Description: prints out the information regarding the LoRa setup

Example:

```
LoRaWAN module - System info:

HW Platform:      RN2483
FW Version:       1.0.3
FW Release:       Mar 22 2017 06:00:42
Hardware EUI:     0004A30B001EF63A

Device Address:   03200003
Device EUI:       0004A30B001F4184
Application EUI:  70B3D57EF000676D
Application Key:  B15B18E9F3ADCD5EB8FF04E41ADF62A8
Adaptive DR:     OFF
```

4.12 Setup LoRaWAN parameters

Key: P

Description: menu for setting up various LoRa parameters

Example:

```
SETUP THE LORAWAN PARAMETERS:

1 - DEVICE ADDRESS
2 - DEVICE EUI
3 - APPLICATION EUI
4 - APPLICATION KEY
D - Set the default parameters
```

4.12.1 Device address

Key: 1

Description: there is no need to change the device address and it should always be set as the serial number of the station

Example:

```
Current Device Address: 03200003
Enter new Device Address [8 numbers in HEX]: 03200003

New Device Address [in HEX]: 03200003
```

Press ESC key to save the new value and to return to the previous menu.

4.12.2 Device EUI

Key: 2

Description: here we can set up the DevEUI value

Example:

```
Current Device EUI: 0004A30B001F4184
LoRa Module HW EUI: AA2A5C5100000000

Do you want use HW EUI as Device EUI? [Y - Yes / N - No]
Enter new Device EUI [16 numbers in HEX]: 004A30B001F4184

New Device EUI [in HEX]: 0004A30B001F4184
Done.
```

Press ESC key to save the new value and to return to the previous menu.

4.12.3 Application EUI

Key: 3

Description: here we can set up the Application EUI value

Example:

```
Current Application EUI: 70B3D57EF000676D
Enter new Application EUI [16 numbers in HEX]: 70B3D57EF000676D

New Application EUI [in HEX]: 70B3D57EF000676D
Done.
```

Press ESC key to save the new value and to return to the previous menu.

4.12.4 Application KEY

Key: 4

Description: here we can set up the Application KEY value

Example:

```
Current Application Key: B15B18E9F3ADCD5EB8FF04E41ADF62A8
Enter new Application Key [32 numbers in HEX]: B15B18E9F3ADCD5EB8FF04E41ADF62A8

New Application Key [in HEX]: B15B18E9F3ADCD5EB8FF04E41ADF62A8
Done.
```

Press ESC key to save the new value and to return to the previous menu.

4.12.5 Set the default parameters

Key: 5

Description: sets all LoRa parameters to the initial values.

Example:

```
Do you want to set the default parameters? [Y - Yes / N - No]
Done.
```

Press ESC key to save the new value and to return to the previous menu.

4.13 LoRaWAN bridge mode

Key: M

Description: opens the direct UART communication with the LoRa module used on the iMETOS LoRa board. It can be used for issuing appropriate commands.

Example:

```
LoRaWAN module - Bridge Mode.  
  
LoRa module power: ON  
LoRa module terminal: ON  
  
RN2483 1.0.3 Mar 22 2017 06:00:42  
  
Bridge mode opened (ESC - close):  
  
mac get deveui  
0004A30B001EF63A  
  
LoRa module terminal: OFF  
LoRa module power: OFF  
Bridge mode closed.
```

To exit bridge mode, press ESC key. Do not forget to exit the bridge mode.

5. Guide revisions

GUIDE VERSION	MODIFICATIONS
1.10	- Renaming.
1.00	- First release of the document.